POPULAR MECHANICS

An Illustrated Weekly Review of the Mechanical Press of the World

"Tells you how to do things" "Written so you can understand it"

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THE NEW YORK PUBLIC LIBRARY ASTOR, LENOX TILDEN FOUNDATIONS

Most Unique Laundry in the World

Strange Scene Enacted Daily at Naples, Italy

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Summer Course in Easy Mechanics:—Making a Box to Contain Shoes, etc.

PUBLIC LAUNDRY AT NAPLES.

[Being a series of interesting views of Laundries of the World personally gathered by Mr. Charles Dowst, editor of the National Laundry Journal, while studying the Laundry systems of all nations. These views portray the curious and unique customs of many lands.]

Sunny Italy can have no more interesting sight for the American tourist than that which this scene presents. All Italy is beautiful, both as regards natural scenery and the unique architecture of its ancient cities. Here in the distance is seen the lovely Bay of Naples on which is situated the city of the same name. But with all its beauties and all its strange and wonderful sights for the visitor from this land of enterprise and progress, perhaps the most remarkable is the daily one on the shores of the river which flows into the bay. Here the women come in great crowds to do the laundry work for their customers. This particular spot has become a popular one, the softness of the river water making it excellent for the purpose.

TINNED EGGS APPEAR ON THE MARKET.

They Are Shelled and Frozen in Cans and Kept in a Good State of Preservation Until Thawed.

Have you yet bought any canned eggs? They are the latest thing in the provision line and the market next winter will probably be full of them. It is an innovation that is the product of necessity, having been brought about by the very high price charged for eggs last year. These canned eggs are also called frozen eggs. They are canned in bulk, the yolks and whites together generally, having been taken from the shell in the process of canning. There is a demand, however, for the yolks and whites separate and the few who tried the experiment last year met with such success that the two parts of the egg may be canned separate to a much larger extent next year.

When the can is opened the eggs are found in a frozen mass, quite as fresh as when they were put up. To insure their keeping, however, great pains has to be taken in the process of freezing and also in their use after the cans are opened. If exposed to the air too long in either case the egg mass is spoiled.

So far the frozen eggs are used principally by bakers, cracker and biscuit manufacturers, etc., but in another year their use will probably become general. The eggs must be kept frozen until time for use. In the process of packing much trouble has been experienced through the need of a satisfactory machine for breaking the shell. Ice and Refrigeration says:

"Some packers claim they can get several pounds per hundred dozen by using a centrifugal machine, but it is done at the expense of quality, especially in breaking dirty shelled eggs, as more or less dirt gets into the meat. In one large packing house in this state we noted the method of breaking was done by girls, and each girl had in front of her three small dishes, holding about one pint each. The egg is broken, examined and graded according to quality. These dishes are frequently emptied. On a stand is a pail of clean water, and every few minutes the dishes are washed in it.

"It has been advised that the best possible package to use is a long, narrow, round can, with simply an opening large enough to pour the eggs into. The opening can either be a screw top or what is known as an oyster lap, and after freezing the same can be soldered on. We noted in Chicago a lot of these eggs put up in common, ordinary, 10-pound lard pails. Inquiry brought forth the information that a great many small bakers would buy a number of these cans and call for them as needed, thus insuring good stock."

The postal officials of Buenos Ayres turned the X-rays onto some suspicious letters which they had no legal right to open and proved that an astonishing amount of jewelry was being smuggled into the country. The evidence was so conclusive that the court ordered the letters to be opened and the jewelry confiscated.

VOLCANOES MAY SOLVE PROBLEM OF POWER.

Reminders of the Great Latent Forces That Might Be Utilized by Man.

Before the recent volcanic eruptions Popular Mechanics published a series of articles entitled "Heat from the Earth as a Source of Power," in which it was outlined that man might by the proper efforts obtain all necessary power for manufacturing purposes, light and heat simply by digging into the earth for it. It was stated, "When once the sulphur dioxide engine, the thermo-electric couple or some other means may be devised to tap this great heat reservoir with its inexhaustible supply of heat, beside which the coal deposits of the earth, consumed and unconsumed, pale into insignificance, it will mean a new civilization, a new world, the greatest step in advancement, a hundred fold, that the earth has ever known. There will be no longer need of coal and the fuel problem will be solved for all time."

The volcanoes that have spouted forth with such tremendous energy since the appearance of these articles seem to have been Nature's efforts in calling attention to the enormous powers lying latent beneath the earth's surface. Prof. Clamond, Harry B. Cox, of Hartford, Conn., and others have strived to perfect the thermo-electric couple with the aid of which it is hoped the earth's heat might be converted into electricity direct without the intermediate use of steam. Prof. Thomas C. Mendenhall, the well known authority on mechanics, is of the opinion that this is possible. Now Prof. William Hallock of Columbian University and Col. Henry C. Deming, a geologist of the United States geological survey, are both of the opinion that the human race may get all its steam power for nothing, by utilizing the resources at hand. Both of these scientists arrive at their conclusions as a result of the force displayed in the recent volcanoes. Col. Deming says that while the events of the last few weeks are appalling in the loss of life, it seems that Nature was emphatically calling the attention of men to an enormous power not utilized for human wants and comfort. The deepest hole in Pennsylvania, in Pittsburg, nearly 6,000 feet, produced hot water; 3,000 feet further he says and it would produce steam.

Prof. William Hallock says that in order to give the steam a commercial value a method must be provided for dropping water to the hot area, allowing it time to heat, and yet having it returned to the surface as steam without interrupting the flow.

Col. Deming concurs in his opinion and further says: "To effect this two holes might be bored into the earth 12,000 feet deep and perhaps 50 feet apart. There would be a temperature far above the boiling point of water, then if very heavy charges of dynamite or some other explosive were lowered to the bottom of each hole and exploded simultaneously a sufficient connection might be established between the two holes. The rock would be cracked and fissured in all directions, and shattering it thus around the base of the holes would turn the surrounding area into an immense water heater.

The water poured into one hole would be heated and turned into steam, which would pass through the second hole to the earth's surface.

The pressure of such a column of steam would be enormous, for, aside from its initial velocity, the descending column of cold water would exert a pressure of at least 5,000 pounds to the square inch, which would drive everything movable through the second hole. The problem is therefore a mechanical one, concerned chiefly with connecting the two holes. This accomplished, the water heater would operate itself and establish a source of power that would surpass anything now in use.

In case of seismic disturbances these holes, if we had them in every city and town in Pennsylvania, would serve as vents and tend to lessen any serious shaking of the earth in any part of the state. We have harnessed the lightning; why can we not now put at least the bridle on the heat beneath us to our benefit?

METHOD OF PRESERVING WOODEN POLES.

The enormous demand for wooden poles for telegraph, telephone and trolley lines has caused the price to double in the past few years. Many of these poles rot in five years. It costs more to replace a pole than to put it in the first time on account of doing it piecemeal and having wires to care for. At the recent convention of the National Electric Light Association, W. E. Moore described the process of preserving wooden poles by creosoting before setting in the ground. This process is 20 years old in England, and has been used on railroad ties for some years in this country.

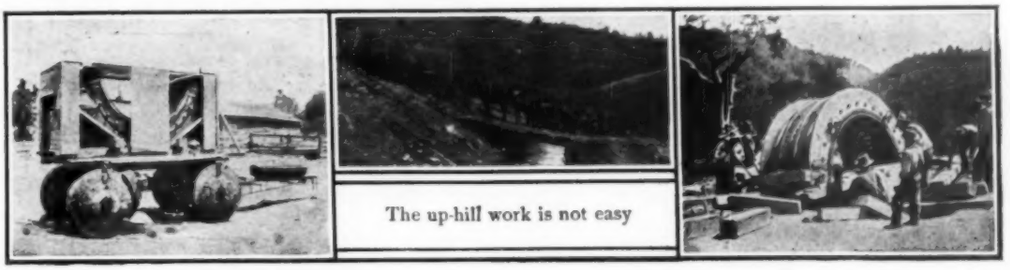
The preserving plant consists of a steel cylinder 6 feet in diameter and 150 feet long. The ends are fitted with plates which can be fastened airtight. A track extends through the cylinder. The poles are loaded on small cars and run in. The ends are closed and steam at 400 to 500 degrees turned in for six hours at 80 pounds pressure. This fills the wood. The steam is then drawn off and strong vacuum pumps exhaust the air which draws out the sap and moisture from the wood. This lasts six hours. Creoscote oil is then forced into the cylinder until it is full, under a pressure of 60 pounds. The oil rushes into the pores of the wood where the sap was pumped out. In from two to four hours the wood is soaked full of the creosote oil. During all these processes the temperature of the cylinder has been kept at 350 degrees by means of steam pipes in the cylinder. The oil is next pumped back into an underground tank, the ends of the cylinder are opened and in an hour the poles have drained so they can be handled. The cars and poles are run out at one end of the cylinder and fresh ones drawn in at the other end, and the process, which has taken from 16 to 24 hours, is repeated. The cost of treating is about twice the first cost of the pole.

The London fire department is said to be the most antiquated in the world. It has no scaling ladders, no chemical engines, no water towers, no automatic fire alarms, and the commander of the fire brigade is a retired navy captain who rendered his first service at a fire after his appointment a short time ago.

ELECTRIC POWER SYSTEMS OF THE FAR WEST.

Most Remarkable in the World.

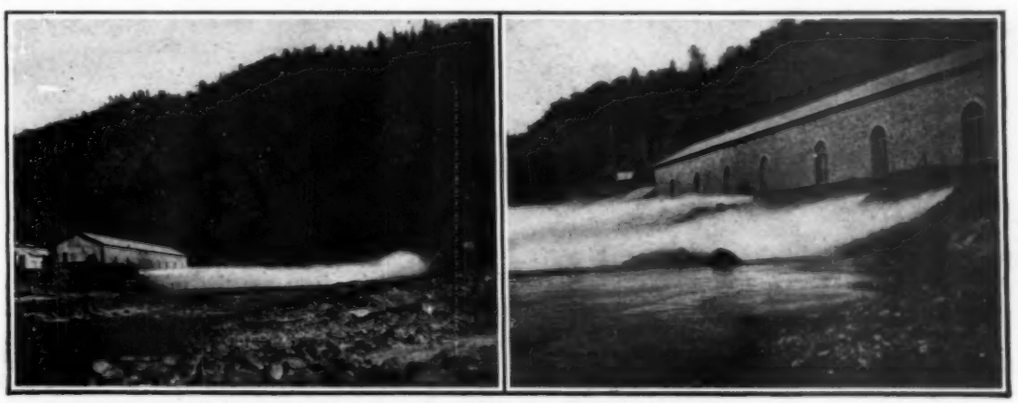
West of the Rocky Mountains are to be found some of the greatest feats of electrical engineering in the world. Away up in the mountains of the Sierra Nevadas, far remote from settlements are wonderful electric plants which famous engineers of Europe are now coming to visit.



The end pictures represent respectively one of the mountain carts loaded with a section of armature, and the same armature in place to be snubbed down the power house hill.

The never failing supply of water from melting snows and mountain springs is taken at a convenient point and conducted for miles to some suitable place for a power house. The water is led through canals, cut out of the solid rock, and wooden flumes until finally it makes a sharp descent through an immense pipe built of heaviest sheet steel and is so conducted to the turbine wheels which drive the generators. The Mining and Scientific Press, of San Francisco, from which our illustrations are taken,

The interior of the Colgate Flume measures 8½ by 6 feet, and the grade is 9 feet to the mile.



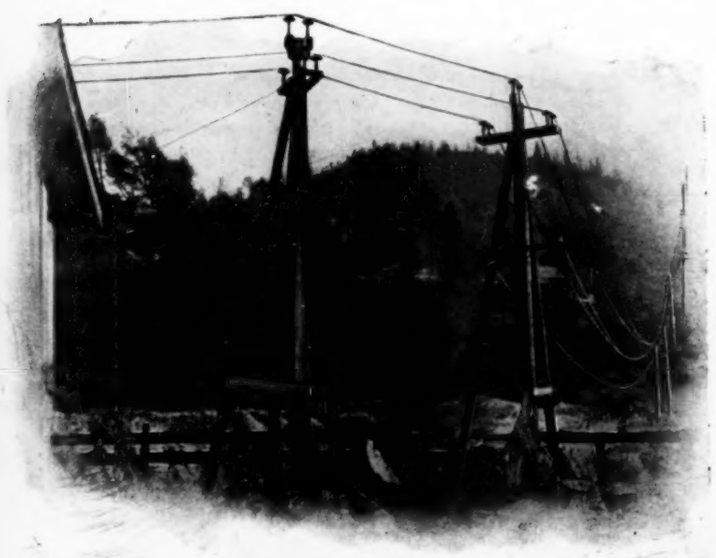
At times of light load portions of the stream shoot out into the river without striking the buckets of the impulse wheels. No attempt is made to "control" the flow of water by the governing apparatus, and sometimes the stream reaches clear across the canyon.

fully describes several of these electric systems. In one instance the electric power is carried 220 miles, from Colgate to San Francisco, being transmitted at a voltage running into the thousands and then transformed into ordinary working voltage at points where the power is to be used in running street cars, lighting, and operating the machinery in mines and industrial

The Leaning Tower of the Carqui nez Span.

works. The cost of installing these generating plants and building the lines of wire is very great, but once in operation the running expenses are very small, and in a country where fuel is as expensive as it is in California, the income from the sale of power is correspondingly large.

To transport the immense electrical machinery up into the



An Angle in One of the High Tension Lines.

mountains is a slow and difficult process. In building the pole lines to carry the wires great care must be taken to select routes where falling trees in storms, or land slides and other disasters frequent in the mountains, cannot destroy the lines. The power house must be protected from the sudden and terrific freshets which rush down the canyons without a moments warning. From first to last the work demands great skill and ability, and as completed is the admiration of engineers throughout the world. Our illustrations give an excellent idea of the character of the work on one of the latest and most important of these power transmission lines.

A YOUNG MAN'S PROSPECTS IN THE RAILROAD SERVICE.

F. A. Delano, general manager of the C., B. & Q., contributes a very valuable article to the American Engineer. We select a few lines:

I am frequently asked by young men, or by fathers or friends of young men, what the prospects are for a young man in the railroad business, with special reference to those with pretty fair education who wish to make railroad work their profession.

It would be a mistake for any man to encourage another to enter railroad work, quite as much as it would be a mistake to encourage him to enter any other profession. The desire to give one's life to any profession must spring from the man himself, and not be forced upon him; but there is much in railroad work which, in the vastness of the field and diversified and absorbing interests, equals that of any other profession.

Let me enumerate a few of the problems which confront the student of railroad questions of to-day, and let me say that even slight progress along any one of these lines is a worthy achievement for one man:

(1) The development of organization; (2) better co-operation between various co-ordinate departments of a large, complex organization; (3) harmonizing conflicting interests in the relations of railway officers and employes, and between the railway and the public; (4) the economic principles underlying the making of rates; (5) the principles of railway location; (6) the practical limits of expenditure in the reduction of grades and curves; (7) the more thorough combustion of coal and the more complete use of the products of combustion in locomotive and stationary boilers; (8) the more economical use of steam in the locomotive engine; (9) economies in shop management and locomotive and car maintenance; (10) water purification, timber preservation, and many more which might be mentioned.

BIG WAGES OFFERED FARM HANDS.

The ports of the Great Lakes are thronged with seamen out of work, because of the unwarranted prediction of a season of unparalleled prosperity made by the newspapers a few weeks ago. People rushed from the farms, the shops and the factory to share in the "record breaking prosperity" on the lakes. Now hundreds of these new men and many of the old men are looking for jobs. They can't get back into the machine shops for they, too, are overcrowded with men. In fact the cities are filled with machinists and engineers and their helpers and artisans of all kinds. At the same time the farmer of the West and Northwest looks out over his crop and weeps as he sees it going to waste for want of help. The standard wages offered for farm help nearly everywhere now is $25 per month with board and lodging. This is much better than is paid the ordinary city laborer and at the end of the season he will have many times as much as if he had remained in town. The expenses on the farm are the minimum; and the $25 might be reckoned as almost clear profit.

With all the modern labor saving machinery now used on farms the laborer has an easy time compared to ordinary work in almost every other occupation. Where he used to walk, now he rides; and there are binders, and hay loaders and all kinds of machines to do the heavy work. An outdoor life, with plenty of good food such as the farmers now enjoy should be a strong attraction to the workingman who is tired of working hard in the city and having nothing to show for it at the end of the month.

A HUNDRED SAVED BY NEW FIRE ESCAPE.

"Shooting the Chutes" Life Saving Apparatus Proves Itself a Wonder at Big Hotel Conflagration.

The accompanying illustration shows the novel new fire-escape which proved such a wonderful life saver at the recent burning of the West Baden Springs Hotel, West Baden, Ind. More than one hundred guests aroused from their slumbers by the roaring, crackling flames, were rescued by the unique contrivance from what would otherwise have been inevitable death. Men, women and children hurled themselves into the scoop-shaped spiral incline and slided to safety as easily as a child slides down the cellar door. The escape extended from the top of the building to within 18 inches of the ground and was so arranged that the escaping persons reached the bottom in a sitting posture and got out of the way without hindrance to the throngs that came shooting down behind.

The hotel was an immense frame structure. It was completely enveloped in flames within a few minutes after the fire was discovered. The fire broke out at one o'clock in the morning and is recorded in fire annals as one of the shortest and hottest on record. The guests had no time to don their clothing and came tumbling down the escape in night gowns, pajamas, night shirts, underclothing and some with almost no clothing on at all.

West Baden Hotel Ruins—The Leaning Appearance of Fire Escape Caused by Defect in Camera.

But not a single life was lost and no one was injured, and while the guests lost all their clothing there is yet much joking in West Baden about the memorable night when the hotel inmates "came sliding down the fire escape."

The apparatus to which so many owe their lives is known as the Kirker-Bender fire escape. Although comparativly new its splendid record has brought it into prominence all over the country and it is now regarded in many places as part of the necessary equipment of leading hotels and office buildings. It is destined to supplant the other fire escapes entirely and firemen say the time is not far distant when the old-time steps and ladders will be entirely dispensed with. It is declared to be the ideal fire escape for actual service in life saving.

The device is manufactured by the Dow Wire Works Company of Louisville, Ky. The Fireman's Herald in a lengthy description of the invention says:

"The escape consists of a spiral slide inclosed in a sheet steel cylinder six feet in diameter resting on a brick foundation. The slide is made of soft box annealed steel securely and smoothly riveted to the cylinders and supported in the center by an iron pipe, the inside diameter of which is three inches. This stand pipe extends the entire length of the escape, and has brass hose connections at top and bottom. The escape is connected with the buildings by iron runways, which are protected with heavy wire rails. All doors are made in pairs, of sheet steel well braced. The entrance doors have projecting frames, so that they can open inward, and not interfere with the slide. These doors close automatically to prevent the entrance of smoke and heat. The exit doors at the bottom open outward. A very light pressure of any object sliding against it opens an automatic latch on these doors. Escaping persons get up as if rising from a chair on reaching the exit.

"A sheet steel roof covers the escape, which keeps it dry and free from snow and ice, which are such a menace to life on all step escapes. The entire work is substantially constructed, and mechanically perfect. It is set between windows, so as not to obstruct ventilation or light."

LARGEST CORN CROP IN HISTORY.

In spite of the heavy and continuous rains and floods which in some sections have greatly injured, and in certain districts utterly destroyed crops, we will have this year the greatest corn crop in the history of the world. From reports gathered from the railroads, the Railway Age states:

A corn crop of fully 2,500,000,000 bushels, which is 300,000,000 bushels more than the biggest crop in the history of the country, is predicted for this year by traffic men and grain statisticians. Two and a half billion bushels of corn means 140,000,000,000 pounds; which means 70,000,000 tons; which, at the liberal average of 30 tons to the car, means 2,333,333 carloads; which, at 50 cars to the train, means 46,666 trains; which means loud calls for cars and engines, long hours and increased pay for train crews, large earnings for the railways, much money for farmers, merchants and all related industries, and a continuance of general prosperity. How much of the possible two and a third million carloads will actually be carried by rail and how much of it will be consumed on the farms cannot be so easily figured; but the bulk of this prodigious yield will reach the railways in the form of corn or of stock, and the roads in the corn-growing regions will have all that they can do for many months and every railway and business in the country will benefit from the prosperity of the producers of this great staple.

Now they have a pea-shelling machine for use in canning factories. The vines are thrown into a hopper which first picks off the pods and then shells out the peas.

It is stated that the Standard Oil Company will build in England a fleet of 12 steamships, of 40,000 barrels capacity each.

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DISPLACEMENT OF WATER BY VESSELS.

The displacement of a yacht or vessel expressed in pounds indicates the weight of the water which the portion of the hull below the water line displaces or pushes aside when the vessel is put into the water, writes C. D. Mower in The Rudder. For example, let us suppose that a yacht is suspended over a basin or tank containing a depth of water sufficient to float her. Now, if the yacht is lowered into the tank it will be found that the water level in the tank is raised. The reason for this is that a certain amount of water is displaced when the yacht's hull is placed in it, and as water is absolutely incompressable, and as the sides of the tank prevent the escape of any of the water, it is forced to rise until it fills a greater portion of the tank. Again, let us suppose that before lowering the vessel into the tank an outlet is arranged just at the surface of the water. Now, when we lower the boat into the tank the water which is displaced instead of rising in the tank will flow out through the opening. If the water which thus overflows is weighed it will be found to exactly equal the total weight of the yacht which was lowered into the tank. Thus, if a race-about, for instance, weighing 5,900 lbs. were lowered into the basin exactly 5,900 lbs. of water would run out through the opening.

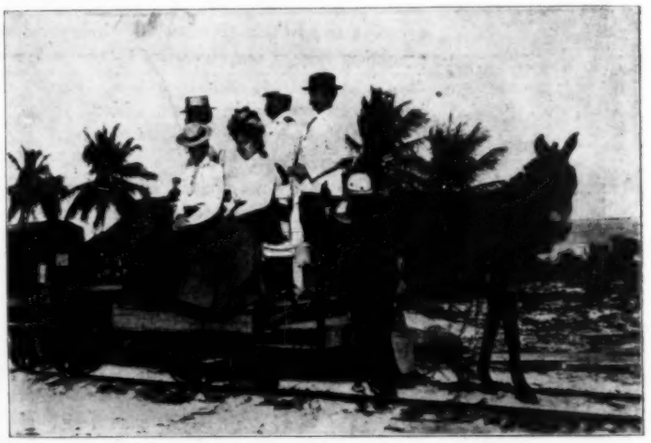
The reason for this is that a vessel or floating body of any kind will sink until it displaces a volume of water equal in weight to the total weight of the vessel and everything on board of her, and then will sink no farther.

A cubic foot of sea water weighs 64 pounds, so a vessel will sink until she displaces one cubic foot of water for every 64 pounds of her total weight. Thus, a yacht weighing 6,400 pounds would displace 100 cubic feet of water; this means that she would settle down in the water until a portion of her hull equal in bulk to 100 cubic feet is submerged, and she will float at that level. If we wish to determine before a vessel is launched where her load water line will come, we must first figure up every pound of weight which goes in to her construction, rig and outfit, and this total weight will show us the weight of water which will be displaced. This total of weight divided by the weight of one cubic foot of water will show the number of cubic feet the under water body must contain, and by a series of calculations on the design of the vessel it can be figured just what portion of the hull will contain this required number of cubic feet.

RAPID TRANSIT IN YUCATAN.

Novel Railway Operated by the Government.

The Xcalak & Aguada railway, which is owned and operated by the government of Yucatan, is seven miles long. The motive



Street Railway Travel in Yucatan.

power consists of one able bodied mule to each train. Passengers and baggage are carried from the sea port to the fresh water steamers which run on the lagoons extending 100 miles into the interior. The Street Railway Review describes the road in a very complete article.

GERMAN FIRM BUYS YANKEE STEEL PROCESS.

The American system of steel rolling, known as the "Grey" process, has been purchased by the Deutsch Luxemburgische Iron company of Germany, as the result of exhaustive tests extending over more than two years. The financial negotiations were closed by John E. Searles, vice-president of the Universal Milling company of New York.

The inventors erected a plant at Differdingen to prove the efficiency of the process. There was a great amount of envious criticism on the part of German technical experts, but the Luxemburg company found that the process enabled them to roll steel with better commercial results than can be obtained from any known European methods. The system combined the vertical and horizontal processes of rolling steel.

NOVEL LATHE AND PLANER TOOL.

A correspondent of the English Mechanic describes an unusual form of lathe and planer tool which probably deserves mention more because of its novelty than its utility.

The tool is said to throw a perfect shaving and to work equally well whether turning or facing. When it gets dull the bolt is loosened and the cutter turned in the holder until a sharp portion is brought around to act on the work. When dulled all around the cutter is removed and mounted on a mandrel on the centers of a grinding machine and ground to an edge all around. If the bolt holding the cutter is slackened the cutter will slowly revolve as the cut proceeds and in this manner continually present a new and cool cutting edge to the work. This action, however, is not recommended, for reasons not given. The correspondent says that cutters for the heaviest lathes should not exceed 1½ inches diameter.

Popular Mechanics wants representatives in every town in America. Pleasant work. Good pay.

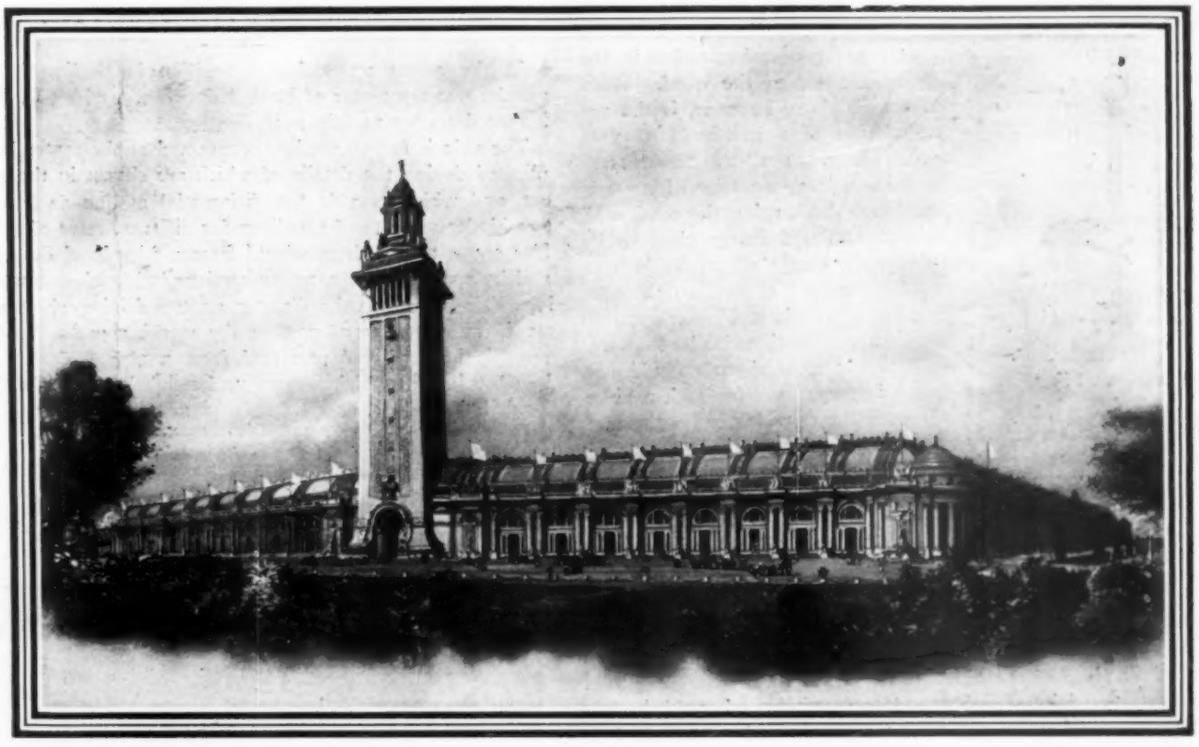
GROWING SCARCITY OF GOOD WORKMEN.

Commenting on the growing scarcity of good workmen in the vehicle trades, The Hub says: There does not appear to be a lack of men, but the weak point is the scarcity of competent workmen. We have frequently called attention to this condition, but the opposing forces are too strong to overcome it, and we can see no possibilities of relief so long as employers make short-time contracts with learners, and workmen's organizations antagonize apprenticeships of any kind. The old-time apprenticeship of four to five or more years has rightfully passed; the introduction of new methods and modern machinery has changed conditions, until now a boy of fourteen to fifteen years of age is an undesirable factor in the shop. The youth of eighteen to nineteen years is better qualified to master his trade during the two or three years preceding his majority than were the boys of years past in their five or six-year apprenticeships. The argument that the introduction of machinery renders skill less necessary than in days past, when machinery was of little import, is a fallacy. Every employer knows that the more skillful the man, the better the work on the machine, and the greater the production. There is no more useless place for an unskilled worker than at the machine; he can neither get out the full working value of the machine, nor get the best results, and much of the claim regarding small wages is from the men who are alike inefficient at the machine or with hand tools.

To write on glass, moisten the surface with strong vinegar, and write with an aluminum point. Small particles of the soft metal are left adhering to the glass, and the writing is fairly permanent.

THE PRIDE OF AMERICAN MANUFACTURERS.

Manufacturers of America are proud of their building which is to be one of the principal adornments of the Louisiana Purchase Exposition grounds. Occupying a conspicuous place in the picture of lagoon, cascades and hanging gardens, it is one of the first buildings to attract the visitor's attention as he enters the grounds by the main entrance. It is one of the buildings on the entrance of the main boulevard. It has a frontage on the north of 1,200 feet, with a depth of 525 feet on the main boulevard. A tower 400 feet high will stand at the angle of the main facade facing north.



Manufacturers' Building—St. Louis World's Fair.

TURKISH RUGS DECLINE IN VALUE.

Turkish rugs show a remarkable decline in value and popularity. They can now be bought in the United States for nearly half the price at which they formerly sold. The same conditions prevail in other countries and Turkey, as a result, is declining commercially. The annual exportation now amounts to about $1,450,000, and includes about 52,000 pieces. The greater artistic designs of the Persian rugs and the superior quality of the wool has placed the latter country ahead of Turkey as a market for high class rugs. The Turkish Journal Ikdam says:

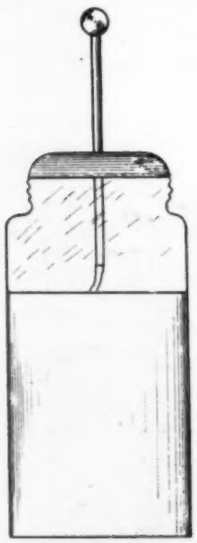
"It is found that the decline is chiefly due to the marked inferiority of the wool now employed in the rug weaving districts. The best grade of wool for this purpose comes from the pastoral regions along the southern half of the frontier between Turkey and Persia. Nearly all of the wool produced in this region is now exported in Persia and but little finds its way westward into the industrial center. It is hoped that with the construction of the Bagdad Railway, the new transportation facilities will change the current of this important product and render it more accessible to the weavers of Anatolia."

Easy Electrical Experiments FOR BOYS

By L. P. Dickinson

CHAP. XXX.—HOW TO MAKE AN ELECTRIC CONDENSER.

Any piece of apparatus which is capable of storing up electric charges, is generally called a "condenser." The term is hardly a correct one, for the action is not a condensing action in the ordinary sense of the word. What does take place, however, is the accumulation of a multitude of very small charges, until the "condenser" contains a large quantity of electricity. Upon discharging the condenser, this accumulated charge gives up its energy, or nearly all of it, in one sudden rush of charge, so that the effect produced is much more powerful than would otherwise be the case. The term "accumulator" would not be an improper one for such a piece of apparatus were it not for the fact that this term has already been universally applied to another and far different piece of electrical apparatus.



A condenser consists essentially of two conductors of electricity separated by some good insulating substance. Thus two sheets of tinfoil pasted upon opposite sides of a piece of window glass, would make a condenser. Or a sheet of waxed paper might be substituted in place of the glass. The larger the sheets of tinfoil, the more electricity will the condenser contain, other things being equal. Making the glass (or paper) very thin, thus bringing the sheets of tinfoil nearer together will also increase the capacity of the condenser.

The form of condenser described in this article is commonly called a "Leyden Jar." Select a one-pint fruit jar, of as thin glass as possible. Procure two or three sheets of tinfoil, each long enough to go completely around the glass jar, and of a width about equal to two-thirds the height of the jar. Paste one of these on the inside of the jar so as to completely line the latter for two-thirds of its height. The easiest way to do this is to first cover the inner surface of the jar with an even layer of mucilage. Then introduce the tinfoil, rolled upon a stick, into the center of the jar. Then unroll the tinfoil and press it smoothly into place using the stick for the purpose. The bottom of the jar on the inside should also be covered. Then the bottom and sides of the jar should be covered in a similar manner on the outside.

Next a cover should be made for the jar of well-dried wood—pine will answer. It should be carefully sandpapered and shellaced. Through its center insert a brass or copper rod about 1-16 inch in diameter, and 6 inches long. It should project equal distances each side of the cover. The upper end is tipped with a small lead ball soldered in place, and finished smooth. To the inside end of the rod is glued a narrow strip of tinfoil, long enough to reach to the bottom of the jar and make contact with the inner coating.

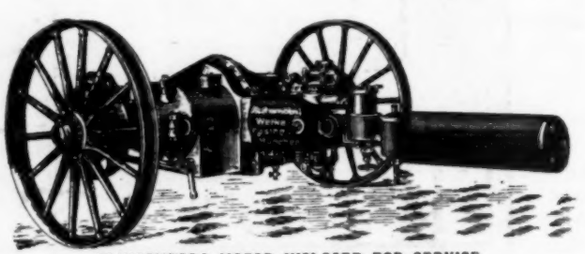
The jar may be used in connection with the electrophorous described in the preceding paper. Connect the outer coating to a gas or water pipe. Charge the disc of the electrophorous in the manner described, and bring it near to the knob on the jar. A spark will jump from the disc to the knob. Repeat this operation a number of times, perhaps twenty or more. By this time quite a charge will have accumulated. By connecting the outer coating and the knob by means of a wire, a comparatively large spark will be seen to pass between the wire and the knob. It is necessary in this and similar experiments that the apparatus be warm and perfectly free from moisture and dust.

By making several such jars, and connecting them together, the effects produced are still more powerful. In such case, all the outer coatings are connected together and to earth, while all the inner coatings are connected to the disc of the electrophorous.

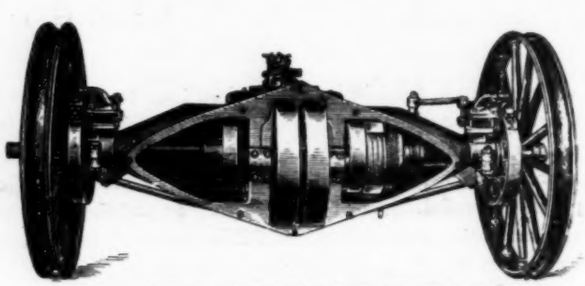
NEW GERMAN MOTOR FOR AUTOS.

At the recent automobile exposition in Berlin, the greatest novelty was the motor of Prof. Klingenberg, which U. S. Consul Mason describes as follows:

The axle is in two sections, connected at the center by a complicated device, the details of which are shown in the following cut, and which provide for differential motion as between the two hinder wheels and couplings for different rates of speed. The idea seems to have been adaptd from a tricycle of French origin, and its application to a motor carriage is ingenious and interesting. The motor works directly on the driving shaft with the maximum economy of power; the working parts are not only securely inclosed and protected from mud and dust, but work in a bath of oil, which secures perfect lubrication. On the other hand, it has the ominous disadvantage that the motor, with all the complicated and delicate mechanism of transmission and differential movement, rests on the axle without springs, and would therefore, in the opinion of critics, be soon shaken out of service by the vibration of travel over a rough road. For exclusively city use, over good pavements, this method of construction—which eliminates chains, cogs, and belts—might prove effective, but for open-country touring its durability is thought to be questionable.



KLINGENBERG MOTOR INCLOSED FOR SERVICE.



SECTION SHOWING ARRANGEMENT OF WORKING PARTS.

MAY REVOLUTIONIZE WAR SHIPS.

The greatest naval invention in many years is announced by Brig. Gen. Crozier, U. S. N., as the result of tests with a new fuse for firing the explosive in a shell. The new fuse does not work until the shell has gone as far as it can into a ship's armor. Then the explosion completes the puncture. If expectations are confirmed this may require the rebuilding of all the navies of the world.

REFRIGERATION AND COLD STORAGE A SCIENCE.

Claim of a German That Cold Does Not Preserve Disputed by Americans.

The alleged discovery of a German scientist that cold storage does not preserve, as told in Popular Mechanics several weeks ago, is forcibly disputed by those Americans who have spent the best part of their lives in the study of ice and refrigeration. This German scientist said that while cold storage products retained much of their original appearance and flavor, they, in reality, had lost their vitalizing qualities and were unwholesome food. Physicians and scientists at the head of some of the foremost medical institutions of America all recognize the power of cold to preserve the nourishing qualities of food stuffs. Men experienced in the refrigerating and cold storage business admit that much depends on the manner in which the products are stored, and they fear this German must have used for samples provisions that had not been properly refrigerated.

The art of refrigerating and cold storage has now been reduced to a science requiring much care and study. It has made wonderful progress in the last few years. But a short time ago the buildings in which were kept the perishable products were cooled merely by storing large quantities of ice in the rooms. By this method it was impossible to keep any product at a lower temperature than 32 degrees—the freezing point.

The modern refrigerating plant is conducted on the same principal as an ice factory. The heat is extracted from the apartments in which the various food products are stored in exactly the same manner as heat is extracted from water in the manufacture of ice. (Pop. Mecs., Vol. 2, No. 3, July 19, 1902.) To insure perfect refrigeration different food stuffs must be kept at different degrees of temperature. For instance, lemons and oranges should be kept at a temperature of 55 degrees, while fish in many instances must be at 25 degrees, or seven degrees below the freezing point. Butter is kept at from 32 to 38 degrees; apples at 28 to 32 degrees; flour, honey, jelly, preserves, etc., at 32 degrees; fresh meat, 38 degrees; ducks, grouse, quail, etc., 32 to 36 degrees; venison, poultry, etc., 25 to 30 degrees.

Most of the fresh, green vegetables which are sold out of season in the North come from storage. One grower near Chicago harvests 30 acres of spinach each fall, puts it into his own cold storage, and receives a big price all winter. Another, a florist, put his entire crop of peonies, (10 acres) into cold storage this summer. The flowers were still in the bud. Next winter he will take them out, when the buds will open on being kept in a warm room for a few hours.

Provisions in Cold Storage—Note Frost on the Pipes.

Marconi expects to have his wireless system of telegraphy in practical operation between his Cornwall station in England and the American station at Cape Cod by the end of the year.

HAND POWER LAUNCH.

J. O. Lanouette, a carpenter of Meriden, Conn., has constructed a neat launch which seats eight persons, has a canopy top, and runs successfully on Hanover Lake. In the stern a system of gear wheels are connected to the propeller shaft to which is attached a heavy flywheel. The operator turns a crank, with each hand and works the steering apparatus with his feet. Fair speed is made. It is easier to turn the crank than pull an oar.

COKE AS LOCOMOTIVE FUEL.

Eastern railroads are using coke as fuel to an increased extent. In the Railroad Journal Henry Barnett, superintendent of motive power of the Boston & Maine R. R., states that on his road they are now burning 160,000 tons of coke a year in 150 locomotives. The advantages are less smoke and cinders; coke equals 80 per cent of the best coals mined It does not seem to injure the boilers or fire boxes, but the gases attack the metals of bridges and station roofs. The coke is severe on the tenders which wear rapidly on account of the sharp cutting edges.

Because the wife of Francis Batcheller, of Brookfield, Mass., has a good voice, 1,200 workmen are out of employment. Mr. Batcheller has closed his factory and gone to Paris with his wife that she may study vocal music.

SHOP NOTES

ROLLING SEAMLESS TUBES.

A recent issue of Stahl and Eisen contains a paper read by Mr. Ehrhardt, of Dusseldorf, on his method of making seamless cylinders and tubes. His experiments began in 1883, but were not successful until 1896, when he was able to pierce large ingots weighing 3½ tons. The process is as follows:

The piercing of the rough ingot is first

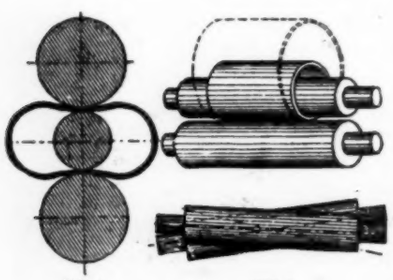


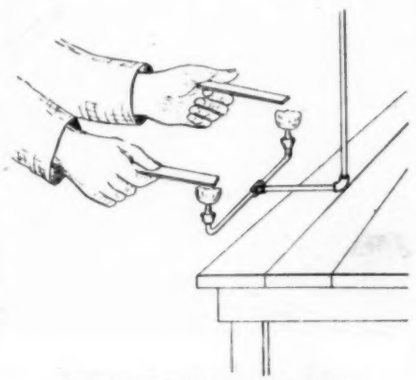
FIG. 1. FIG. 2.

performed in a hydraulic press of great power, after which it is placed on the mandrel of a drawing press and drawn out through dies to a length corresponding to that of the finished tube. It is also essential that the sectional area of the material forming the blank should be exactly equivalent to that which it is desired ultimately to give to the tube in its final shape. During these preliminary operations the material undergoes mechanical treatment of a most severe nature, more especially in the direction of its longitudinal axis. After forming the cylindrical blank it is placed in a pair of rolls, the upper one of which can be easily unshipped from its bearings to enable the hollow cylinder to be slipped over it, while the lower one is held up to its work by hydraulic rams which exert an absolutely uniform pressure on the piece during the process of rolling. To expedite the operation, and also to diminish the amount of pressure which it is otherwise necessary to put upon the rolls, the bottom roll is arranged to oscillate sideways, during rolling, about a point exactly midway between its bearings, Fig. 2. This confers the advantage of being able to reduce the pressure on the rolls, because instead of having to exert an even pressure over the whole length of the blank, the lower roll, when swung out at both ends, bears only in the center, and in like manner, on coming back into line with the upper roll, the ends of the blank, in their turn are subjected to the pressure. The real value of the oscillating motion, however, lies in neutralizing the effect produced by the bending of the rolls themselves. This tendency to bend must be reckoned with, particularly in the case of the rather smaller upper roll, Fig. 2, because the wall of the tube is liable to assume a slight convexity of form—that is to say, it will become thicker at the center than at the outer extremities. By imparting a continuous oscillating movement to the lower roll it is found, however, that this tendency can be completely obviated.

The true circular form of the blank is preserved during rolling by means of guide rolls, which are capable of ready adjustment to the successive variations in the diameter of the cylinder.

WASTE OF FUEL BY BOILER SCALE.

Scale in boilers has always been supposed to cause great waste in fuel. A correspondent of the Engineer is disposed to question this waste as being as great as at present established. The books say 1-32 inch of scale increases fuel consumption 8 per cent; 1-16 inch scale 15 per cent; ⅛ inch 20 per cent; ¼ inch 35 per cent, and ⅜ inch 56 per cent. While he does not defend scale, he doubts the accuracy of the figures from various experiments. One was the taking of a piece of scale which he trimmed down until it was ¼ x ¾ x 8 inches. He then cut a piece of boiler iron to the same size. Taking



Testing Conductivity of Scale and Steel

a piece of scale in one hand and the boiler iron in the other, he held them over gas burners of equal flame. The iron heated first, but there was little difference in the heating of the two, which leads him to believe the established tables may be wrong.

A French inventor, Pierre Faure, Limoges, France, has made a machine for decorticating ramie without injury to the fibre.

The auxiliary cruiser, Mayflower, has been converted into one of the finest yachts afloat and is to be used as the official yacht of the president of the United States.

The Illinois commission has decided to spend $75000 on the Illinois State building at the Louisiana Purchase Exposition.

BOILER NOTES.

Calculate that boilers operated at 5,000 feet above sea level require 16 per c nt more air (or draft) than when used at sea level, and about 35 per cent more at 10,000 feet elevation. The capacity of a flue or smokestack is determined by its height as well as by its diameter, says Mining and Scientific Press.

In return-flue boilers, the longer the flues, the larger would be their diameter. When selecting return tubular boilers, where cordwood is to be used, let the diameter be small in proportion to length, but when coal is to be fired the diameter should be large in proportion to length of shell, as the flame is so much shorter with coal than with wood. See that the flues do not come nearer than one-fourth of the shell diameter from the top of boiler and that all flues are not less than 1 inch apart. Also require a man-hole below the flues and a man-hole above the flues. Have a regular time for cleaning the soot from flues of boilers and sediment and scale from the inside of boiler; neglect of such cleanings means waste of fuel and decay of boiler. An exhaust heater heats the water fed to the boiler by means of exhaust steam from the engines; in addition to saving from 5 to 15 per cent fuel it avoids the damage otherwise done to the boilers feeding cold or only warm water to them. Records for highest fuel economy in boilers have often been made by internally fired boilers. A water-jacketed fire-box is more conducive to economy than setting in brickwork. Radiation or waste of heat from a boiler can be prevented by coating with non-conducting material rather than by brick setting, besides incurring less cost and occupying less space.

SOME RULES FOR CASTING ALUMINUM.

Pour this metal as cold as possible, says a writer in The Foundry. Of course, thin castings have to be poured hotter than those of heavier section, but on general principles this rule holds good in all cases. A convenient way of ascertaining the temperature of the metal is as follows: If its color is red, stir with a pig of aluminum until it is white. The melting of the pig will serve as a guide so far. Then dip the end of a cold pig three-quarters of an inch or so into the metal, when the aluminum will chill around the pig, and when the latter is withdrawn from the melted metal remains like a little cup on the surface of the metal. The time required for this chilled metal to melt gives a good idea of the temperature of the metal in the crucible.

Use sand as dry as possible, and avoid sponging a mould. A little filing on the casting where the mould tears up is more to be preferred than a lost casting. Small bodies of sand nearly surrounded by metal

such as the center cores of small set collars, are almost certain to blow if the sand is a little damp.

Use large sprues and heavy gates. In some cases, however, it will not do to put a large gate on a thin casting, as the gate sometimes draws from the casting.

Pour rapidly. Just "dump" the metal in. Aluminum is not as liable to wash away portions of the mould as other metals, on account of its lightness.

Ram the moulds very softly. It is not necessary to ram these nearly as hard as for iron, as aluminum is but one-third as heavy. Soft ramming will very often prevent the breakage of castings when they "set." The reason for this is that aluminum, just after it solidifies, is very weak and crumbly, and will scarcely bear its own weight. Vent all moulds well.

THE EVOLUTION OF THE HAMMER.

It would be an interesting study to seek out the origin of all our common tools and utensils and to trace in detail the various steps as they developed into their present-day forms. The first plow was undoubtedly a forked stick, drawn along the ground. The hoofs of oxen were used in early days in place of the threshing machine, and the primitive wheel was roughly hewn from a solid block of wood, probably from a section of a tree trunk.

Our familiar hammer has been evolved through the ages by a similar process, says the American Blacksmith.

Man must early have grasped the idea of holding a rock in his hand to lend weight to the blow and protect his own flesh. Then came the idea of fastening to a stick by a thong, or by piercing the stone to accommodate the handle. Such was, without doubt, the crude forerunner of our modern steel implement. Metal succeeded stone and requirements of weights caused growth in size, so that we next find the machine hammer, the trip, tilt or helve hammer. The application of steam to the hammer marks another stage, Nasmyth's upright hammer as perfected to-day, being the highest type. The limit to the weight of this hammer was reached in the last decade, at least for metal working, when it was found that the immense 100-ton machines did not yield as good results in working metals as did the slow-motion hydraulic press, by which they have been superseded.

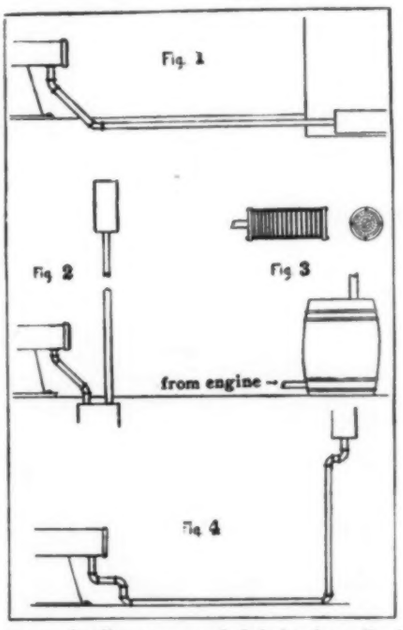
EXHAUST PIPING OF GASOLINE ENGINES.

One of the greatest troubles in the use of gasoline engines is to overcome the noise of the exhaust. The Grain Dealers Journal suggests a plan as follows:

The odor of the burned gases is disagreeable, requiring considerable length of pipe to remove them, and increasing the back pressure. The evil of long piping can be overcome by making the pipe large, and with 45 degree elbows instead of 90 degree elbows, as shown in Fig. 1, given herewith. The fewer bends the better.

The end of the pipe should not be below a window or near enough to the ground to annoy pedestrians. An elevation of 10 to 15 feet usually is sufficient. The open end of the pipe never should be placed where dirt or sand can be sucked into the cylinder, with certain damage to the cylinder and piston from grinding by the grit.

Exhaust mufflers are attached when the noise of the explosions is annoying. The construction of the ordinary exhaust muffler is shown in Fig. 3. A dozen perforated cast iron plates are held together by four iron rods. The inner plates are grooved to fit together. When the perforations in the plates have been stopped up by long use or feeding too much lubricating oil, the plates should be taken apart and heated in a wood fire until the grease has been burned off. A barrel loosely filled with bricks makes a cheap and practical muffler. A short length of pipe should extend up from the cover of the barrel.



A drip cock should be placed at the lowest point of the exhaust pipe near the engine, to drain any moisture which may collect in the pipe during the night by condensation, and run back into the engine when it is started.

Fig. 4 shows a pipe with too many turns. When many bends are unavoidable, and the pipe is long, the remedy, aside from making the pipe large, is to put in an exhaust pot, as shown in Fig. 2. An exhaust pot is a large cast iron vessel, placed as close to the engine as convenient and buried in the ground. The larger the capacity of the pot in comparison with the size of the engine cylinder the more effective is it, not only in diminishing the back pressure, but in silencing the noise of the exhaust.

Never lead the exhaust pipe close to wood or other material likely to ignite, as the pipe sometimes becomes hot enough to char, and may start a fire.

NEW ENGLISH ELECTRIC AUTO.

A new electric auto which H. F. Joel, of London, is bringing out, is being watched with interest. An entirely new battery, having a capacity of 18 watt hours per pound of complete cell, and expected to be very long lived, is one feature. The motor will be multipolar of 6 horse power, weighing less than 200 pounds. The Electrical Times, London, says: a patented system of winding a multipolar machine by placing the wire in a continuous coil around the pole pieces instead of having a separate coil for each pole, is the most striking feature of the Joel machine, and it is claimed that by this method half the quantity of copper generally found necessary for motors of any given size can be dispensed with without sacrificing efficiency in any way. The exciting current for a 4-pole machine of 6. h. p. is only 60 watts, about the same as that taken by an ordinary 16-c. p. lamp.

CUTTING WITH ELECTRIC ARC IN PRUSSIA.

We recently illustrated and described the cutting of heavy steel tanks in Chicago, by means of an electric arc. In this case the arc was used to avoid noise. From Prussia comes an account of similar work where the arc was used. At a colliery in the Dortmund district of Prussia it became necessary to dismount a horizontal arm of some pump rods. The bolts and cotters could not be removed on account of rust, and lack of space prevented the use of chisel and hammer. The electric arc was therefore called into service. The energy employed, says the London Colliery Guardian, was obtained from a continuous-current dynamo, generating 320 amperes at 110 volts, which served for lighting, the negative pole being put in connection with the pump rod, and the positive with a carbon 6-10-inch in diameter, held in a well-insulated gas pipe. The latter was fitted with a rest, so that the carbon might be guided by hand; and, for preventing danger from fire, a bucket filled with sand was placed under the spot where the melting was to be effected, while a small hand pump was also held in readiness. For protecting the men's eyes from the bright light, red and green glasses were provided, to be held in the hand. The work was carried through with a current of 320 amperes at 60 to 70 volts, the carbon point being held 1½ inches away from the point to be melted in such a manner that a vertical slot was formed, and then gradually deepened. The work was performed by six men, who relieved one another every hour or half hour, in about 12 hours altogether, including a few interruptions.

Summer Course in Easy Mechanics For Boys.

By Wilbert S. Drew.

[This series, commenced in issue of June 28, will continue each week. It will give instructions which any boy can understand, how to use carpenter's tools and make things. In doing this only a few tools will be required, and cost of material will be small. The articles to be made will include a boat, table and similar subjects.]

MAKING BOX TO CONTAIN SHOES, ETC.

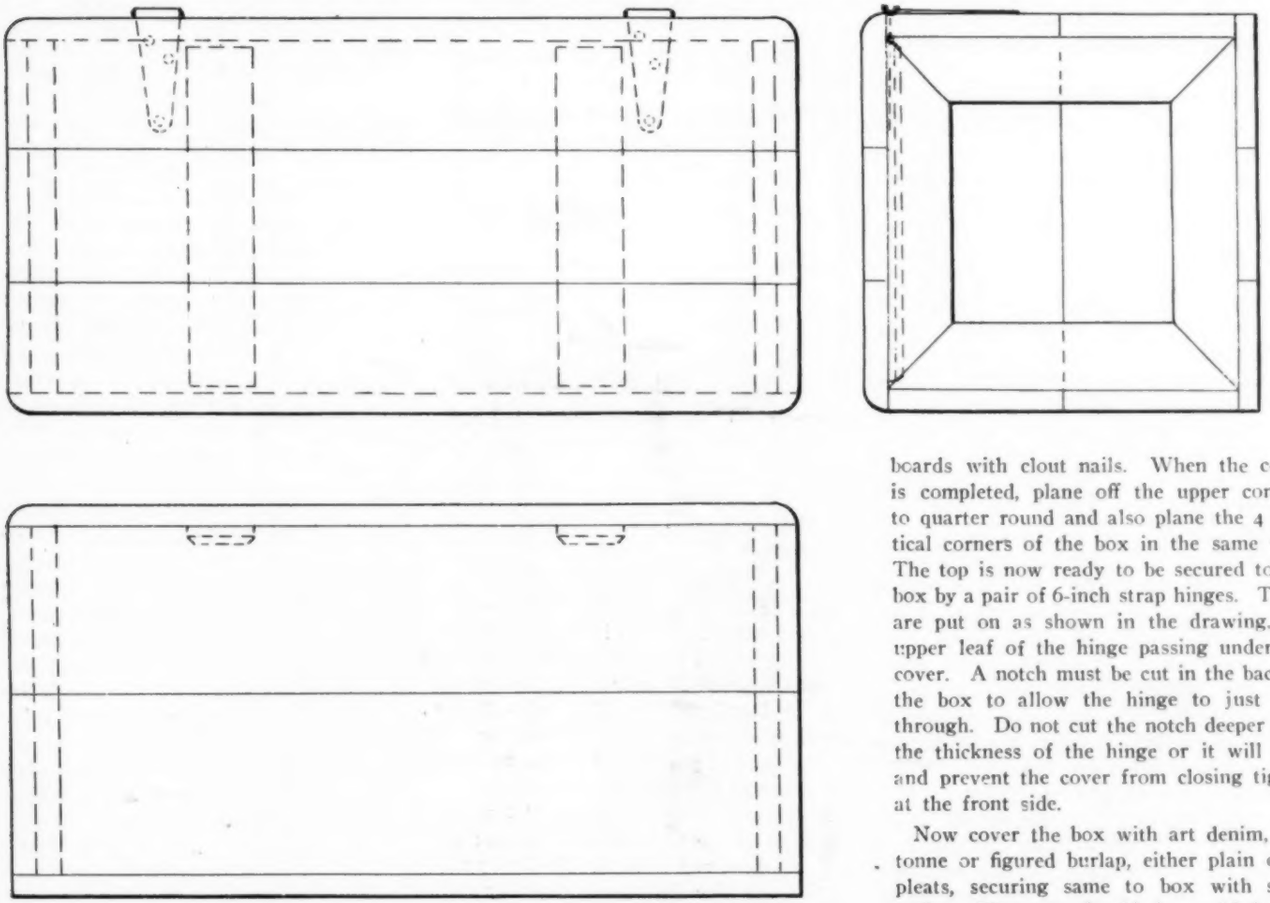
This box is to be 18 x 18 x 36 inches, and may be made of any kind of soft wood about one inch thick. Hemlock, pine, white wood, or bass wood will serve the purpose well.

The front and back and the ends may be conveniently made of boards 8 inches wide, while 6 inch boards will serve nicely for the top and bottom. Cut off 4 pieces from the 8 inch stock, each 36 inches long, plane the edges square and straight and carefully square the ends. These are for the front and back. Next get out 4 more pieces of the same width, each 16 inches long for the ends. Be sure that corresponding pieces are of equal width; also that the ends are just square. For the top and bottom use 6 pieces of the 6-inch stock, each 36 inches in length. Now saw a 6-inch board in two along its center line, making two pieces a little less than 3 inches wide. Plane the edges of these to equal width and cut off 8 pieces each 16 inches long and mitre the corners, to form the end panels as shown by the end view in the drawing. The object of these pieces is to hold the upper and lower boards together and to strengthen the corners of the box.

These mitres may be laid out with the carpenter's square, by the method used in laying out the rafters in last week's article.

A few clout nails are desirable in nailing on the panel pieces, but if these cannot be obtained common wire nails will do. They should be 2¾ inches long in either case. Place two of the end boards together on the bench, and nail the panel pieces to them, as shown in end view of drawing, but do not drive the nails quite through the lower piece until all are in place; then put a heavy piece of metal, such as a flat-iron, sledge hammer or ax head under one of the nails and drive it home with a few sharp blows. This is in case the clout nails are used. They will be turned over and clinched on the under side. Treat each nail thus until all are clinched. If wire nails are used, simply drive them through both pieces, bend the ends over with a hammer and then pound them down level with the wood on the metal block. Treat the other end in like manner and then nail on the front, back and bottom with 8 penny nails, nailing both into the end and panel pieces.

The top should be put together with two cleats as shown by the dotted lines. These cleats are 3 inches wide, 15 inches long, and have the corners on the under side bevelled off and are secured to the top boards with clout nails. When the cover is completed, plane off the upper corners to quarter round and also plane the 4 vertical corners of the box in the same way. The top is now ready to be secured to the box by a pair of 6-inch strap hinges. These are put on as shown in the drawing, the upper leaf of the hinge passing under the cover. A notch must be cut in the back of the box to allow the hinge to just pass through. Do not cut the notch deeper than the thickness of the hinge or it will bind and prevent the cover from closing tightly at the front side.



BOX FOR CONTAINING SHOES ETC.

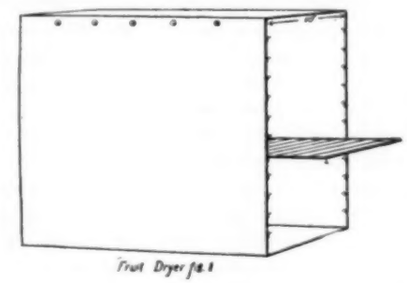
Now cover the box with art denim, cretonne or figured burlap, either plain or in pleats, securing same to box with small tacks. The top should be padded with cotton batting or tow and then it makes a comfortable seat.

If this box is made of cedar and care taken to make all the joints tight, it makes an excellent chest in which to pack away winter clothing to preserve it from the attack of moths. When used for this purpose, it would be better not to cover the box with cloth, but finish the outside with oil and shellac. If any trouble is found in getting the joints between the boards perfectly tight, paste a strip of heavy paper over them on the inside.

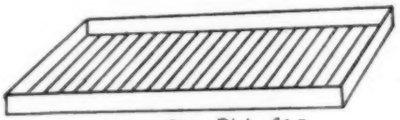
Next week we will take up the making of a stand on which to polish shoes.

HOME-MADE FRUIT DRIER.

A practical fruit dryer, which can be made at any tinshop, is described in the American Artisan. The box is made of any desired size of ordinary galvanized iron



Fruit Dryer fig. I



Wooden Slide Rack fig. II

with provision by holding several trays. These trays are made of wood in the shape of a shallow box, open at the top and with the bottom formed of wooden slats to allow the heat to rise, but sufficiently close so the fruit will not drop through. For drying corn cut from the cob, spread a piece of cheese cloth over the bottom of each tray. The dryer is set upon a cook stove.

STREET RAILWAY CONGRESS IN LONDON.

English and continental street railway managers held a week's congress in London commencing July 1st. The general sense of the meeting was in favor of paying rent for the use of the streets. Electric brakes were considered better than air; heating cars was deemed unnecessary; storage battery cars were vigorously condemned as costing twice as much to operate as horse cars. As nearly every country in Europe was represented, the banquet and reception was amusing; many of the gentlemen trying to speak in languages foreign to their own. Twenty-five governments sent accredited representatives to the congress.

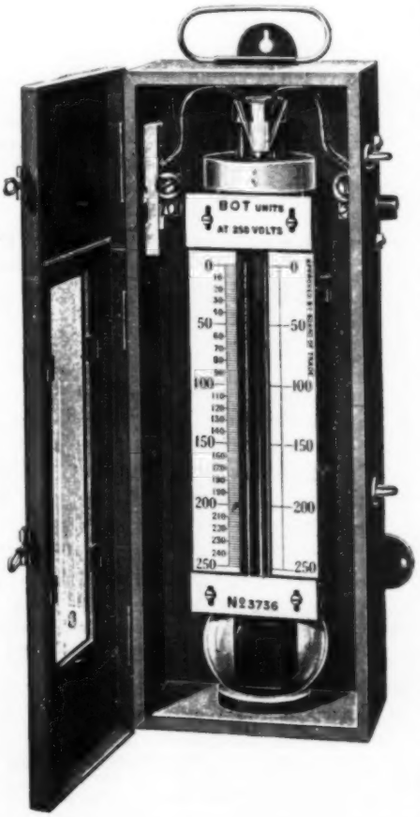
ESQUIMAU ARROW HEAD FOUND IN WILD GOOSE.

In the breast of a wild Canadian gray goose, shot and killed by John Cockran near Liberty lake, was found an arrow head of walrus ivory. The goose is now on exhibition at a gun store in Spokane. The arrow is unlike anything of the kind ever seen in the United States before. When Cockran picked up the bird he was surprised to see a little piece of ivory sticking two inches from its breast. The flesh had grown around it and it was difficult to pull it out. The arrow head was about eight inches long. The carvings on the stem where it was tied to the arrow are still visible. The bird had undoubtedly carried the ivory prong for many thousands of miles from the far north where it was shot by one of the fur clad natives

AN ENGLISH ELECTRICITY METER.

Nearly everyone is familiar with the gas meter, though it is doubtful if one person in a thousand of those who pay gas bills ever saw the inside of one or has any idea of how it works. The universal opinion, however, is that a gas meter never sleeps.

The measurement of the amount of electric current is accomplished in a very different manner from measuring gas. Our illustration shows an electric meter in general use in England. The ordinary small meter in this country works by dissolving metal placed in a chemical solution. The more current passing through the more metal is dissolved. Once a month the metal is weighed and the loss in weight represents a certain amount of current passed through and used. This English meter is called the Bastian and is built somewhat



like a thermometer. It has the advantage of being readable to anyone.

It uses the principle that water is decomposed and passes off in gas by a current of electricity passing through it. As will be seen in the cut the meter consists of a glass tube to contain the electrolyte; a vulcanite frame to carry the platinum electrodes and lead leading-in wires. A graduated scale expressed in Board of Trade units forms the basis of charges. The difference between the reading and that of any previous reading represents the amount used. In our illustration the meter reads 40 B. O. T. units. One of these meters of 10 amperes capacity costs about $12. In operation the whole of the current to be measured passes from one platinum electrode to the other through the electrolyte, and as this current passes the water alone of the electrolyte is decomposed, the oxygen and hydrogen gases produced escaping into the air. This reduces the level of the electrolyte (sulphuric acid and water). Parafine oil is poured on top to prevent evaporation. There is no shunt and the meter will not short circuit.

THE "PER DIEM" SYSTEM FOR FREIGHT CARS.

An ordinary train of 50 freight cars frequently contains cars from more than a dozen different railroads. Many of these cars are hundreds of miles away from the nearest station on the road to which they belong. For instance, a car may be loaded in New Jersey and go through to Oregon. In this event the car may not be returned to its owners for weeks or months. The system in force for years has been for each road to pay to the road owning these "foreign" cars so much a mile for the distance over which the car is hauled. Some roads which are poorly equipped and cannot afford to buy enough cars to haul its own freight on its own lines, hang on to foreign cars belonging to other roads for months. It is handy for the line which has the use of the cars, but expensive for the owners who are thus kept out of their property and who get very little return. An average freight car travels one day and is sidetracked waiting to load or unload three or four days. Perhaps the car was only hauled 10 miles, in which case the owner road would receive about 10 cents for the four days' use of the car, which cost $500 or more.

The new arrangement which went into effect in July provides for a charge of 20 cents a day for the first 30 days or less, and $1 per day thereafter as long as a car is on a road to which it does not belong. The result is to hurry and get rid of foreign cars as soon as possible. In Russia under the per diem system freight cars average to travel 80 miles a day. In this country on some roads it has averaged as low as 18.

In a sworn affidavit filed by President Charles M. Schwab the assets of the United States Steel corporation are estimated at $1,400,291,000.

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PIG IRON HIGH.

One of the largest producers of pig iron in the South is taking orders for delivery in 1903, at $17 a ton. This is an advance of $5 a ton over 1902 prices.

TRAIN BREAKS WORLD'S RECORD.

The Twentieth Century Limited on the Mohawk Division of the New York Central, broke the world's record for long distance running on a trip from Albany to Syracuse. It made the 148 miles between the two cities in 145 minutes including a stop at Utica and several slow-downs.

PORTABLE TELEPHONE FOR ARMY USE.

At the forthcoming French army maneuvers, the new field telephone, the Charollois system, will have a thorough trial. The inventor, Capt. Charollois, claims that moving bodies of troops, not more than six to seven miles apart, can be connected by telephone to his simple, strong wire laid on the ground. Whether the wire is walked on or tramped on doesn't make the least difference; it will operate as long as the ground is dry. In wet weather the wire is to be placed on trees, fences or sticks. The wire is so thin that a distance of half a mile can be covered with wire weighing less than six pounds.

KAISER'S YACHT, METEOR, A DISAPPOINTMENT.

It is the general opinion among expert builders of America and Germany that Emperor William's American built yacht Meteor is a decided failure. That the yacht was in second place in time allowance in the Heligoland-Dover race confirms this opinion, which has prevailed for some time. From the Meteor's pretentions, it should have won the race easily, with plenty of time to spare. The results of its racing were extremely disappointing. It is not expected the Meteor will race next year in its present form. If it does not do better in the Kiel regatta, Aug. 15, it may be entirely rebuilt.

SIR HIRAM MAXIM TO BUILD AIRSHIP.

Sir Hiram Maxim, the famous engineer and inventor, will go to work as soon as his health will permit upon new experiments for a flying machine. Sir Hiram is slowly recovering from an attack of bronchitis and has gone to the south of France for a course of special treatment at one of the baths. He expects to return September 1st. His idea is a machine which will have either the smallest relation to or none at all to a balloon. He firmly believes that an effective machine can be made with which to navigate the air. He has already spent about $75,000 in experiments, and is quite as strong as ever in his belief of final success.

OUR DRESS GETTING POORER ALL THE TIME.

That Americans wear an inferior grade of clothing to that which they wore in former years is evinced by the decreased consumption of wool and the increased use of cotton. In 1890 the per capita consumption of wool handled by American manufacturers was a trifle over 6 pounds. In the census year 1900 the average consumption was only 5½ pounds. There have been times when the per capita consumption of wool in the United States was 50 per cent greater than it was in 1900. With the decline in the use of wool the consumption of cotton has proportionately increased. In 1890 the American manufacturers used 1,193,000,000 pounds of cotton, and in 1900 1,910,000,000 pounds. The increased demand for cotton and the decline of wool is accounted for largely in the many adulterations of fabrics. Probably the American people think they are wearing as much wool as ever before, but manufacturers have now become expert in mixing a little wool with much cotton and giving it the immediate appearance of all wool.

AN AFFECTIONATE FAREWELL.

The Rev. Mr. Hahn recently took leave of his little flock in a New Jersey town with the following words: "Brothers and sisters, I have come to say bood-bye. I don't think God loves this church, because none of you ever die. I don't think you love each other, because none of you marry. I don't think you love me, because you haven't paid my salary. Your donations are moldy fruit and wormy apples, and 'by their fruits ye shall know them.' Brothers, I am going to be Chaplain of a penitentiary. I go to prepare a place for you, that where I am there ye may be also. May the Lord have mercy on your souls. Good-bye."

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OVER FORTY THOUSAND PATENTS ON FARM MACHINERY.

Over forty thousand patents have been issued on machinery for making the work of the farmer easier, quicker and cheaper. To be exact 42,174 patents had been granted up to January 1st of this year. Applications were refused on nearly 50,000 devices. A general classification of agricultural machinery patents shows: plows, 11,625 patents; harrows, 5,774; planters, 8,566; harvesters, mowers, hay loaders, 11,258; threshers, 4,951.

EXPANSION OF THE IRON TRADE.

The expansion of the iron trade is one of the wonders of recent years. The London Iron and Coal Trades Review says: If in the United Kingdom the average consumption of pig iron were the same as it was in the United States in 1901, we would have consumed in that year 1,300,000 tons more than we actually did, and until last year our average individual consumption of iron was larger than that of the United States or any other country. When we add that since 1860 the average annual American consumption of iron per individual has increased about seven and a half times—taking the figures for 1901 as the ultimate standard—it should encourage us to believe that in the world at large there is still enormous scope for expansion in this great industry, and that it is difficult to calculate the dimensions to which it may ultimately attain. The average consumption of pig iron in the world today—assuming a total production of 1,400,000,000—is only sixty-seven pounds, or a trifle over the average of the United States in the decade 1850-60. That average, however, is steadily increasing from year to year, and it is likely to continue to do so in the future to such an extent as to falsify any anticipations of industrial ruin to our own or any other country, when founded on no better basis than that of the more rapid progress of a rival nation.

SEISMIC STUNTS.

Said Smith to Jones, "These signs portend
That the world's approaching a sudden end."

Said Jones to Smith, "How can that be?"
You're talking at random, it seems to me."

Said Smith to Jones, "But you're not versed
In seismic stunts when they're at their worst."

Said Jones to Smith, "by gum, are you
The chap all the knowledge was handed to?"

Said Smith to Jones, "Doggone your hide!
Are you the controller of flood and tide?"

Said Jones to Smith, "Now, don't get hot,
You think you're smart, but, consarn you, you're not!"

Said Smith to Jones, "Aw, cut it out!
You're arguing things you know nothing about!"

Said Jones to Smith, "You son of a gun,
I've a mind to haul off and smash you one!"

Said Smith to Jones, "Before you try
You'd better arrange your affairs to die."

Said Jones to Smith, "By hokey poke,
I'll show you this argument ain't no joke."

And then each worthy doffed his coat
And grabbed for the other's indignant throat,
And both fought hard for each inch of ground
Till gore was distributed yards around.
Smith's face was wrecked, and Jones' the same,
But each was defiant, and each was game;
To stop the fight each man was loath
Till a big, mean copper arrested both.

* * * * *

Now the two are trying in vain to find out
What the deuce all the trouble started about.
—Baltimore News.

There's the music of the birds,
There's the music of the bees,
There's the music of the forests
In the grand old trees;
Nature's symphony is sweet
And without a single flaw;
But we listen to the music
Of the hammer and the saw.

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